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ABSTRACT

A long-range financial planning model was developed by the staff of the Minnesota Higher Education Coordinating Board to explore the issues and problems facing the financing of Minnesota postsecondary education. The model was designed to determine the extent to which alternative general financing policies and specific funding formulas affect system and state level expenditures and financing patterns. The model helps assess the general financial impact of projected enrollment trends under current policy guidelines while also simulating alternative sets of financing guidelines and estimating their effects on overall expenditures and financing patterns. It helps to assess the specific financial impact of alternative policies at different enrollment margins and assists in identifying and/or confirming which policies are in need of more specific and detailed analysis. It also helps in the educative component of policy deliberations by illuminating quantitative relationships among volume, expenditures, and sources of revenue in postsecondary education. A graph of projected full-time equivalent enrollment for 1977-2000 and a schematic of expenditures and staffing are appended. (SW)

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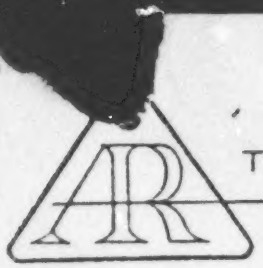

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LONG-RANGE FINANCIAL PLANNING IN MINNESOTA:

EXPLORING STATE LEVEL ISSUES, PROBLEMS AND ALTERNATIVES

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LONG-RANGE FINANCIAL PLANNING IN MINNESOTA: EXPLORING STATE LEVEL ISSUES, PROBLEMS AND ALTERNATIVES

ABSTRACT

Faced with the prospect of declining enrollments, and assuming minimal real growth in available state resources, many problems emerge in the financing of public post-secondary education. It is unlikely that system and institutional resources can be reduced in a manner symmetrical to their increase as the fixed and semi-fixed nature of many resources impair flexibility. The state level problem becomes one of determining an appropriate set of funding mechanisms which takes into account the diverse missions of institutions yet is sensitive to fluctuating enrollment levels. The mechanisms and formulas need to move beyond the traditional linear funding approaches and exhibit marginal or incremental characteristics which more accurately represent actual financing conditions.

To explore the issues and address the problems facing the financing of Minnesota post-secondary education, a long-range financial planning model has been developed by the staff of the Minnesota Higher Education Coordinating Board. The model is designed to determine the extent to which alternative general financing policies, and specific funding formulas, affect system and state level expenditures and financing patterns. This model helps assess the general financial impact of projected enrollment trends under current policy guidelines while also simulating alternative sets of financing guidelines and estimating their effects on overall expenditures and financing patterns.

As the "decade of decline" approaches, many states are beginning to re-examine their financing policies for post-secondary education. Minnesota is no exception. While Minnesota has a long and enviable commitment to post-secondary education, the manner in which this commitment is met must be re-assessed in light of actual and projected demographic and social changes. Currently, post-secondary education institutions in Minnesota enroll over 175,000 full-time equivalent students in four public systems (three collegiate and one vocational) and 28 private collegiate institutions. Within the four independently governed public systems are over 65 institutions ranging in size from less than 300 full-time equivalent students to over 45,000.

Given the diverse context of Minnesota post-secondary education, the Minnesota Higher Education Coordinating Board has prepared 25-year enrollment projections for each public system and institution. These projections indicate that in the aggregate Minnesota will experience a slight increase in enrollments over the next several years followed by declining enrollments into the mid-1990s before a slight upturn occurs (see Figure 1). However, the magnitude and impact of these enrollment fluctuations will vary greatly not only among systems but also among institutions and programs.

The state is entering a period where its enrollments will increase from approximately 175,000 full-time equivalent students to slightly over 180,000 in 1981. By 1994, however, it is expected that full-time equivalent enrollments will have fallen to slightly over 136,000 students. If the aggregate trends were reflected in each of the public systems and institutions, dealing with the problem of declining enrollments would be greatly simplified. However, there is great variation as to the extent and timing of the enrollment decreases. For example, public vocational-technical institutes are expected to experience only a 10 percent decrease from their 1981 peak enrollments.

By contrast, the public collegiate systems will experience decreases from their peak projected enrollments of between 23 and 30 percent. (MHECB, 1977)

Further compounding the problem are the number, size, location and types of institutions and programs which are publicly supported. At present, approximately one-half of the state's population lives in the seven-county metropolitan area and the other half is scattered over the remaining 80 counties. It seems clear that post-secondary educational services will continue to be delivered in outstate regions where enrollments will not be sufficient to generate appropriate economies of scale. State decisionmakers are increasingly faced with the realization that if it is among the state's primary goals to promote access into post-secondary education, it will be necessary in the future to maintain some institutions which have disproportionately high per unit expenditures. The awareness of this political reality has focused increasing attention on refining appropriations formulas in those institutions and systems where a sufficient enrollment base is present to justify certain marginal economies of scale.

Faced with the very real possibility of enrollment declines on the order of those discussed above, it has become apparent to the post-secondary education community in Minnesota that it is necessary to re-examine the financing of post-secondary education (MHECB, 1977). This is particularly important since present financing mechanisms are the outgrowth of a period of substantial increases in enrollments, faculties and facilities. Present state financing policies for public institutions, because of their reliance upon faculty/student ratios, tend to place great emphasis on enrollment increases in increasing institutional resources. Yet, as enrollment declines materialize, continued reliance on formula/ratio type funding could result in severe resource reductions. While it may be difficult politically to

completely eliminate volume related funding, this does not preclude attempts to refine enrollment driven funding mechanisms.

A major problem confronting all of post-secondary education is the degree of its responsiveness to reductions in enrollments. Over 80 percent of the costs associated with providing post-secondary education are personnel costs and, because of collective bargaining agreements and tenure policies, there is minimal flexibility in reallocating and reducing this personnel component. Factors such as the labor intensiveness of post-secondary education and the semi-fixed nature of most costs, coupled with the necessity to maintain at least a minimum academic "core" regardless of enrollments, severely impair the responsiveness of post-secondary eudcation to enrollment declines. Most importantly, post-secondary education is not able to reduce resources in the same fashion as it increases them.

Finally, it has become clear in Minnesota as in other states that post-secondary education is entering into a period of constrained resources; that is, a period in which there can be little expectation for real resource growth. At the present time, there appears to be considerable public concern over why it is the case that if resources requirements increase as enrollments increase why resources requirements will not decline as enrollments decline. Because of the dramatic impacts of inflation, this situation is not unique to Minnesota nor is it unique to post-secondary education. Yet, the public is beginning to evidence reluctance to provide resources in excess of inflation.

Faced with problems of this type, a preliminary state-level problem has become one of determining an appropriate set of funding mechanisms which take into account the diverse missions of institutions and the semi-fixed nature

of their resources but are, at the same time, sensitive to fluctuating enrollment levels. It appears that in order to deal with the problems facing Minnesota post-secondary education and the constraints imposed on any attempt to alter present public policies, the mechanisms and formulas used in financing post-secondary education will need to move beyond the traditional linear funding approaches and exhibit marginal or incremental characteristics which more accurately reflect actual financing conditions.

It was in order to explore these issues and address the problems discussed above in financing Minnesota post-secondary education that a long-range financial planning model has been developed by the staff of the Minnesota Higher Education Coordinating Board. In general, this model attempts, given projected enrollments, to determine the extent to which alternative financing policies both within a base and at a margin will affect overall expenditure levels and financing patterns. The attempt is to provide a long-range context for present appropriations and budgetary decisions and to clarify quantitative relationships in the financing of post-secondary education. While it is doubtful that the utilization of this model will provide decisionmakers with an identification of the most optimal funding policy available, it may, nonetheless, serve the function of eliminating or clarifying the long-term implications of decisions which must be made within each funding cycle.

The model is designed to assist the state-level decisionmakers in attaining several policy related goals. It provides a method to assess the general financial impact of enrollment trends under current policy guidelines. It further allows for the simulation of alternative sets of financing guidelines as well as the evaluation of their effects of overall expenditure levels and financing patterns. It helps to assess the specific financial

impacts of alternative policies at different enrollment margins. It assists in identifying and/or confirming which policies are in need of more specific and detailed analysis. And finally, it helps in the educative component of policy deliberations by illuminating quantitative relationships among volume, expenditures and sources of revenue in post-secondary education.

The present focus of the Minnesota long-range financial planning model is only on instructional and support activities which are closely related to enrollments. While the support activities are presently aggregated, it is possible to alter the model to reflect the actual programmatic system budget structure. Simulations are at the system level with all systems analyzed in a uniform methodological manner. This model represents the first detailed step in exploring the long-term implications of general state financing guidelines. A preliminary data base for this model was installed in late November and debugging simulations have been made since the first of the year. A less sophisticated model was installed and tested during the spring of 1977.

The model is designed within the State Planning System software package developed and installed by the staff of the National Center for Higher Educational Management Systems (NCHEMS, 1977). This State Planning System software package allows the user the flexibility to design virtually any model which can be stated in FORTRAN expressions. While there are certain qualitative relationships which are difficult to express within this software package, the staff has found that those limitations do not apply to the types of policy investigations currently being undertaken and envisioned in the near future.

Using projected enrollments, the model can segment these enrollments into a base enrollment level and three marginal enrollment levels. The

decision as to size of the base enrollment is a policy decision and can be altered in different runs of the model. So, too, can the size of the margins.

During each run of the model, whether for total projected enrollments or for the base and each of the margins, total expenditures are calculated by applying staffing ratios to enrollment levels to generate the personnel component. Personnel compensation is a function of the number of personnel times the inflation adjusted average personnel compensation. Non-personnel expenditures per student can also be adjusted for inflation and real increases and are taken times the enrollment level to generate total non-personnel expenditures. These personnel and non-personnel expenditures are then summed to provide total system expenditures. A generalized schematic of this component is shown in Figure 2.

The staffing and expenditure calculations are quite simple. Instruction or support personnel are a function of enrollments times a staffing ratio: i.e.,

$$\text{Enrollment}_{m} * \text{Staffing Ratio}_{tpm} = \text{Personnel Component}_{tpm}$$

where m = enrollment margin or base, t = type of personnel category (classified or unclassified), and p = program (instruction and departmental research or support). Personnel compensation is a function of the personnel component times the appropriate adjusted personnel compensation per position; i.e.,

$$\text{Personnel Component}_{tpm} * \text{Adjusted Compensation}_{tpm} = \text{Personnel Compensation}_{tpm}$$

Non-personnel expenditures are a function of enrollments times adjusted non-personnel expenditures per student; i.e.,

$$\text{Enrollment}_{m} * \text{Adjusted Non-Personnel Expenditure/Student}_{pm} = \text{Non-Personnel Expenditures}_{pm}$$

Aggregations of personnel components, compensation and non-personnel expenditures can be made across enrollment categories (m), personnel categories (t), and programs (p).

Each of these variables can be analyzed not only for base level enrollments but also for each of the marginal enrollment levels. Perhaps the great strength of the model in considering various financing options is that the basic policy controllable variables of staffing ratio, personnel compensation and non-personnel expenditures per student can be varied for different enrollment policies as well as for the direct instruction and support functions. For example, while the unclassified staffing ratio, that is, for faculty, may be set at the current funding formula for the base and, while the adjusted unclassified compensation may be set at the average unclassified personnel compensation for the base, these two components can be changed for each enrollment margin to assess the differential impact which these staffing and compensation policies would have on total system expenditures. Thus, the model allows the analyst to respond to the question, "What would happen if..." or as it is more often phrased, "What is the difference between present and proposed policies?"

These are three general sets of simulations which can be refined for the purposes of identifying specific policies. These simulations can be provided with no inflation to indicate constant dollar change and with inflation to demonstrate the effect that inflation will have with or without changes in present policies. Set one provides a basic projection where the base level of enrollments is equal to the projected level of enrollments. The second set simulates symmetrical marginal policies. Here, the base is not equal to projected enrollments but the funding formulas represented at each marginal level of enrollment are symmetrical for enrollment increases and decreases.

Finally, the model allows for a third set of simulations where the marginal financing policies are asymmetrical. Again, base enrollments are not equal to projected enrollments and the funding policies simulated are not the same for marginal enrollment increases as they are for marginal enrollment decreases. In other words, the model has the capability to simulate marginal increases in enrollment in a manner different from simulating marginal decreases from the enrollment base. In the former case, resources are added to the base and in the latter they are subtracted from it. This appears to be one of the strengths of the model since, as was noted above, there does not seem to be symmetry between increasing post-secondary education resources and decreasing resources from a base level.

There are several assumptions built into the model which, as in the case of all models, simplify its relationship to reality. It is assumed that:

1. The system is responsive in each year of change.
2. The system does have some flexibility in its personnel resources.
3. Enrollments and attendance patterns are independent of financing patterns.
4. There will be no change in the present institutional or system configurations in Minnesota.

However, it is with the recognition that these assumptions tend to over-simplify the complexity of the financing relations involved that discussion has begun concerning potential refinements for this model. Specifically, discussions are underway as to the development of different models for each system of post-secondary education to reflect more fully the differing missions, resource allocations and clientele of the public post-secondary systems. Refinements will include a lag factor for increases and decreases in the faculty complement. An adjustment of enrollments to reflect

projected adjustments in tuition levels caused by changes in resource requirements is being considered. And finally, an external constraint on expenditures and resources required and an automatic recalculation of constrained expenditure levels utilizing the optimization component of the State Planning System software is being designed.

The model will be fully implemented in the fall of 1978 as updated data becomes available in the biennial budgetary process. It is presently anticipated that the model will serve a supportive function in considerations of system level budget requests for the upcoming biennium by providing a mechanism to assess the long-range implications of the staffing and compensation components of these requests

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Minnesota Higher Education Coordinating Board, Planning for Fluctuating Enrollments, St. Paul, Minnesota, 1977.

National Center for Higher Education Management Systems, State Planning System Documentation (Technical Reports 86-97), Boulder, Colorado, 1977.

FIGURE 1

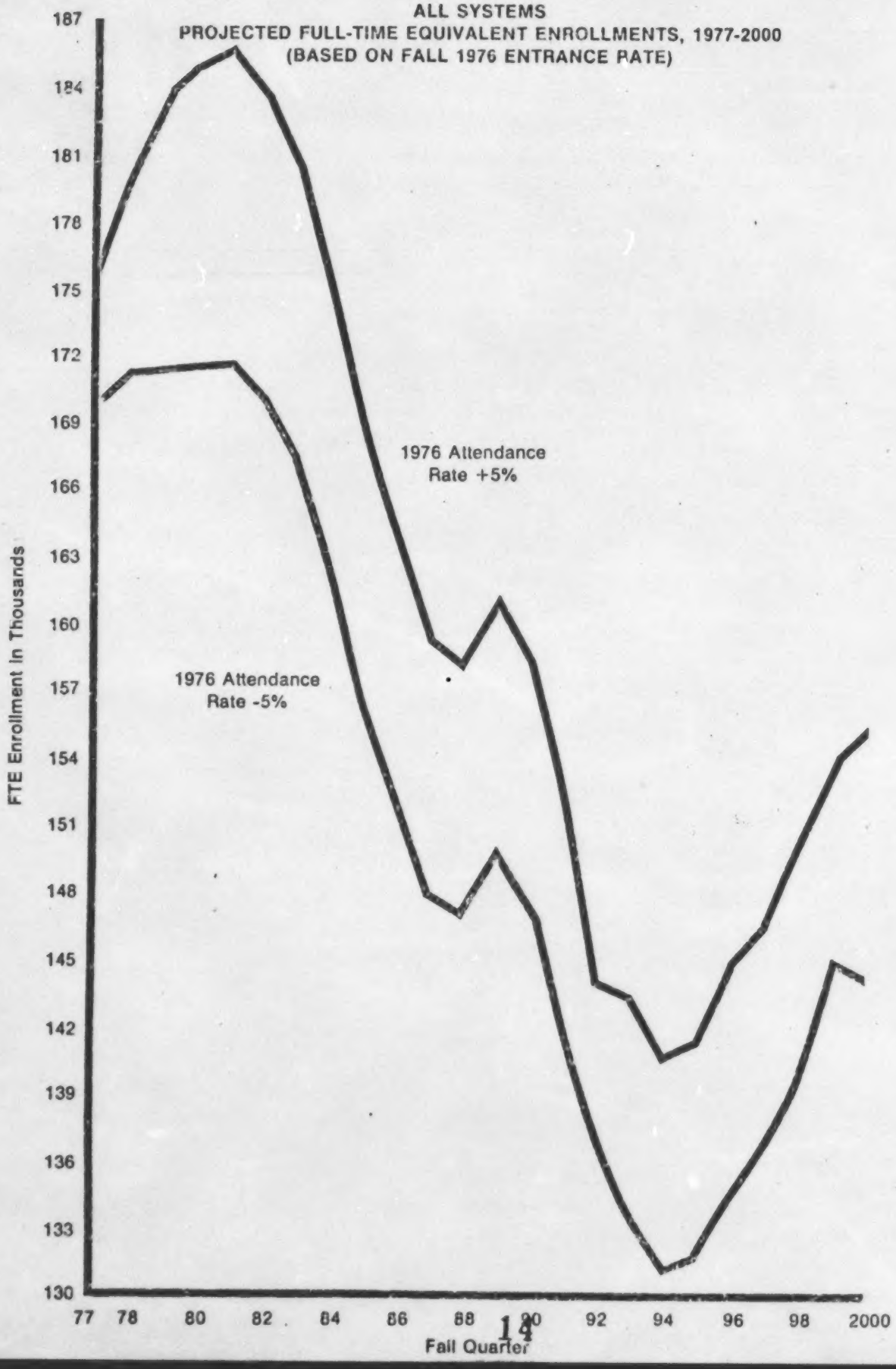
ALL SYSTEMS
PROJECTED FULL-TIME EQUIVALENT ENROLLMENTS, 1977-2000
(BASED ON FALL 1976 ENTRANCE RATE)
1976 Attendance Rate +5%
1976 Attendance Rate -5%
FTE Enrollment In Thousands
187
184
181
178
175
172
169
166
163
160
157
154
151
148
145
142
139
136
133
130
77
78
80
82
84
86
88
90
92
94
96
98
2000
Fall Quarter

FIGURE 2

GENERALIZED SCHEMATIC
STAFF/EXPENDITURE CALCULATOR